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DEFICIENCY DISEASES IN DOMESTIC ANIMALS *

BY

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I have been asked to talk here to-day about deficiency diseases in general, but I propose also to discuss other metabolic diseases which are closely related to them.

Deficiency diseases in domestic animals are of momentous importance throughout the world, inasmuch as, generally speaking, the animals are fed the same ration from day to day, and are reared principally for the purpose of obtaining the highest possible net proceeds, *i.e.*, of assuring the best possible result at the lowest possible cost (including labour), in the form of meat and pork, milk and egg production.

With varied feeding, as in the case of dogs and also of man, deficiencies in the food are more likely to be made good from one day to another than when the ration is the same from day to day. When this ration is deficient in some respect, there is the grave risk of serious consequences in the form of lower production, reduced reproductive ability, unsatisfactory growth or—in severe cases— manifest disease conditions. Other results of inferior feeding are increased susceptibility to diseases of a different nature, particularly infectious diseases, with serious complications. The fact that the food must be as cheap as possible tends naturally to increase the risk of poor quality food being used. On the other hand, it is to the breeder's or owner's advantage that the composition of the feed is such as to make the rearing of the animals profitable.

What, then, is a deficiency disease? As a rule, the results of underfeeding are not regarded as deficiency disease, but the term refers to disturbances in the metabolism which are due to the fact that one or several of the food components, essential for the life or the health of the animals, are lacking or are present in inadequate amounts, or that the animals are unable to utilise them. The composition of the feed is shown by its content of:

1. Proteins, carbohydrate and fat—the food-substances proper.
2. Mineral salts, above all calcium and phosphoric acid.
3. Vitamins and other compounds which are essential for the formation of hormones and enzymes.
4. The digestibility of the feed.
5. The quality of the foodstuffs.

I will not deal with the two latter factors to-day. Besides the amount of protein in the ration, which will not be discussed here, the qualitative composition of protein is undoubtedly of great importance. We know that the proteins are hydrolised in the digestive tract into amino-acids, which are then built up by the organism into a suitable composition. At present more than 20 different amino-acids are identified. Some of these can be synthetised by the organism from other nitrogen-containing products—for instance, from other amino-acids—while others must be supplied to the organism. These latter are indispensable or essential for normal growth. The most important of these are threonine, valin, leucine, isoleucine, arginine, lysin, methionine, phenylalanine, tryptophane and histidine. These contain groups of atoms which the organism cannot synthetise by itself but which are necessary for the formation of many proteins, enzymes and hormones essential to life. Thus in zein—a protein of maize—tryptophane and lysin are lacking. In gelatin thyrocine and tryptophane are lacking and it is also poor in cystine. Casein is deficient in glycin and has a low cystine content. Gliadine (of wheat) is relatively poor in lysin. Cystine is not an indispensable amino-acid. It may be substituted by methionine which, however, is also absent in casein. Arginine, which is indispensable to mammals, is an important factor, above all in the formation of spermatozoa. This may be of some significance in relation to sterility in males. Glycin, which is a dispensable amino-acid for mammals, is an essential dietary component for chicks. This fact, I think, has been overlooked hitherto and very likely may account for disease conditions in chicks. I wish to mention that casein and lactalbumin are poor in glycin and that egg-albumin, gliadin and zein (common proteins in various cereals) are entirely devoid of glycin. The practical value of this should be investigated.

The proteins most suitable for growth are those of animal origin and especially those which nature has provided for the nourishment of the growing animal, namely, the proteins in the milk. Further, the composition of the proteins in meat is fairly adequate. In composing rations for hens and swine and carnivora, these facts are undoubtedly of great importance and account for the value of a milk diet for the growth of these animals.

With regard to straw feeds, our knowledge in this respect is limited and personally I think that with greater knowledge of these factors we should be able to solve the problem of some of the deficiency diseases the nature of which has up to now been obscure.

There is no doubt that the amino-acids play an important part in the formation of enzymes and hormones and that faulty composition of the protein in the feed may cause disturbances in metabolism. I will revert to this question later.

The fat in the food is valuable, above all, as a source of energy. The fat may be substituted by carbohydrate and protein. A ration entirely free from fat, however, may cause retarded growth and metabolic disturbance—particularly in the skin, with attendant skin diseases. This is due to the fact that some unsaturated fatty acids are indispensable to the organism. Their effect is not known, but in

* This paper was the opening contribution to the proceedings of the Swedish Veterinary Congress held in Stockholm on October 5th, 1949. We would draw the attention of Members, N.V.M.A. to the fact that Professor Carlström paid the delegates of our Association attending that Congress the very great compliment of giving this address in English.

many instances it has been demonstrated that the addition of small amounts of fat—lard or butter, for instance—will cure skin diseases and promote the growth of animals.

We know that the carbohydrates in the ration serve as combustion material and that, in most animal species, they may be substituted by fat and protein. This does not apply to ruminants, however, in which as shown by recent investigations digestible carbonydrates play an important part in the normal rumen digestion. Several substances essential to the organism, such as vitamin B, nucleoprotides and other amino-acids, undoubtedly are formed in that process. We do not yet know all the details but we know for certain that many of the deficiency diseases in ruminants are due to an unsuitable feed composition in respect of carbohydrates and protein, and that they may be prevented or cured merely by effective changes in this regard. So far as animals which are required to perform heavy work or those whose products are rich in carbohydrates such as milk are concerned, the carbohydrate content of the feed is a very important factor.

Calcium and Phosphoric Acid

The importance of calcium and phosphoric acid in the ration has been discussed so often that I shall not deal with this question. I will content myself with mentioning that in the case of quickly growing animals, such as swine, foals and calves, large additions of these substances are essential in order to avoid disturbances in bone formation. In slowly growing animals, such as small breeds of dogs and also man, the content of calcium and phosphoric acid in the food is not of the same fundamental importance. Here vitamin D is the most important element, as the food in most cases contains sufficient mineral salts. The chief thing is that they be utilised in the organism. In the quickly growing animals the supply of mineral salts is the predominating factor. Vitamin D is certainly required, but here also it is of secondary importance. In rachitic diseases, on the other hand, an ample supply of vitamin D is particularly necessary, but this form of therapy is not enough, unless calcium and phosphoric acid are supplied at the same time. The value of pure phosphorus as a prophylactic and therapeutic agent in veterinary medicine is disputed. In human medicine the therapeutic value is repudiated, and in experiments on growing swine I have also failed to find any prophylactic effect of pure phosphorus. I am fully convinced already, however, that in manifest rickets phosphorus has a favourable effect, not because of its ability to prevent the rachitic development of the skeleton, but because of its ability to increase the growth of the compact tissue of the bone and thus to prevent curvatures and assure a firmer attachment of the ligaments.

The phosphates in the feed are also important factors in metabolism, particularly in the metabolism of carbohydrate and fat, which is also evident from the number of different diseases appearing as a result of phosphate-deficient feeding. By this I do not wish to imply that an adequate supply of phosphate always leads to an effective conversion of fat in the organism. This is a question which I shall discuss later.

Vitamins and Hormones

In the time available to-day I cannot deal with the importance of the different vitamins in metabolism. Instead, I shall try to explain briefly the connection between the effect of vitamins, of enzymes and of hormones. Vitamins have been defined as biocatalyzers, of an organic origin, which must be supplied with the food. They have also been called exogenic hormones. This definition, however, is no longer appropriate, as we now know that vitamin B can be formed normally in the organism, particularly in herbivora. Vitamin C is formed in the organism, at least in full-grown domestic animals, and they are therefore not dependent on the supply of this vitamin. We do not know where or under which conditions these vitamins are formed in the body, we only know that in rats the presence of vitamin A is required for their formation. Vitamin D is formed, by the effect of ultraviolet rays on the skin, from cholesterol, and vitamin K is formed normally in the intestine. When inadequate amounts are formed, the vitamin may be supplied in the diet.

A hormone may be defined as a chemical substance which, having been formed in one part of the body, is carried in the blood stream to another organ or tissue and influences its activity. With the exception of the secretions of the thyroid, gonads and adrenal cortex, the various hormone preparations are almost or quite inert when administered orally. The formation of hormones requires the supply of such atom complexes as cannot be synthetised by the organism. These are contained in certain amino-acids and also in some vitamins. This shows that the formation of hormones is dependent on the diet and that certain metabolic diseases may be due to deficient feeding as well as to disturbances in the function of the hormonal glands caused by other factors.

In this connection I wish to say a few words about some diseases which as the result of recent research have been attributed to disturbances in the function of the adrenal cortex. Hensch and co-workers have demonstrated that hormones from the adrenals (Compound E) as well as from the pituitary gland (A.C.T.H.) will cause prompt remission of nearly all the symptoms in rheumatoid arthritis. We do not yet know how this effect is brought about. From the size of the required doses (100 mg. of Compound E) it seems clear that it would not be a matter of actual substitution therapy. M. Vogt, on the other hand, has shown that in dogs weighing 10 kg., the adrenals, which together weigh about 1 mg., during 24 hours excrete the same amount of cortical hormone as that present in 17 kg. of adrenals. This seems to indicate that the doses given should not be regarded as physiologically too large.

A remarkable fact is that the cortical hormone, which principally regulates the conversion of electrolytes, has no therapeutic effect in rheumatoid arthritis. Compound E, which chiefly influences the metabolism of carbohydrate and also of protein, has up to now been found to be the only definitely effective agent. Zeller, who at present is studying these problems, claims that Compound E can hardly be effective in any other way than by influencing the enzymes—in the first place those enzymes the active group of which is adenosine thriphosphoric acid. Treatment with Compound E would thus stimulate the carbohydrate metabolism, which would explain the therapeutic effect. The principal cause of rheumatoid arthritis would be a disturbance (a reduction) in the power to convert carbohydrates, which in its turn is due to functional disturbances in the adrenal cortex or the pituitary gland. The good results obtained with ATP treatment in cases of rheumatoid arthritis seem to us to bear out Zeller's theory.

During the last few months workers in America have shown that several diseases localised to the nervous system or caused by reduced metabolism respond favourably to treatment with the same cortical hormone. We have had the same experience with regard to adenosine thriphosphoric acid. Several of these diseases obviously have some con-

nection with deficiencies in the diet. It is also clear that some of them respond favourably to vitamin B therapy. It is evident, therefore, that vitamins and hormones may influence the carbohydrate metabolism in the same direction. The fact that in these diseases reduced carbohydrate metabolism following inadequate phosphorylation evidently is responsible, shows the importance of phosphorylation in the appearance of deficiency and metabolic diseases.

Let me give another instance. In the horse there occur two forms of muscular disease which clinically are intimately related to each other. The one form is obviously a deficiency disease, the other a metabolic disease which in all probability is of a hormonal origin. I am thinking of polymyositis or maxillary myositis and paralytic myoglobinaemia (azoturia) in horses. In both cases the cause is a disturbance in the carbohydrate metabolism with accumulation of lactic acid in the muscles. In the former case this is due to a deficient supply of certain as yet unknown food components. In paralytic myoglobinaemia it is in all probability a matter of an increased breakdown of carbohydrate due to hormonal disturbances.

I have compared the conversion of phosphate in the organism in paralytic myoglobinaemia, acetonaemia and polyarthritis by means of radioactive phosphorus. In myoglobinaemia the phosphate is converted rapidly, probably as a result of an abnormal increase in the rate of carbohydrate metabolism. In acetonaemia and polyarthritis the carbohydrate metabolism is low and the conversion of phosphates is abnormally slow. Adenosine thriphosphoric acid increases the carbohydrate metabolism by promoting phosphorylation. In myoglobinaemia the same treatment is not effective.

Enzymes are formed in the organism and influence the chemical processes as catalyzers. Several enzymes contain vitamins in the molecular group. This is also the case with some trace elements, for instance, manganese, magnesium and cobalt. Vitamins as well as trace elements are thus important factors in the formation of enzymes. Also some vitamins contain trace elements. I wish to mention particularly that recently cobalt has been found to be contained in vitamin B_{12} which cures pernicious anaemia in man.

Deficiency diseases have various causes, but the true deficiency diseases are attributed to the fact that the feed does not contain sufficient amounts of the components required for the maintenance of a normal metabolism. It must be remembered, however, that the organism's need of these substances varies considerably. Increased metabolism requires an increased supply. A high metabolic rate occurs in growing animals, in pregnant animals and in animals on increased production (for instance, high milk or egg yield), having vigorous exercise, exposed to cold, suffering a disease condition, particularly one attended by fever. In all these circumstances the body requires an ample supply of these substances. An adequate diet is therefore not adequate under all conditions, and the ration must of course be altered accordingly. But the required components need not necessarily be supplied in such quantities as to satisfy an emergency need—as, for instance, diseases with high temperature, exposure to cold, or vigorous exercise. It has been said that deficiency diseases will never be abolished among domestic animals for the reason that the increased demands on the animal's production will always be satisfied first. Only when the effects of the increased production become evident in the form of disturbances in metabolism will it be possible to consider the measures to be taken to prevent these disturbances.

Disturbances in metabolism of a deficiency nature may also arise as a result of the inability of the organism to form such vitamins or other substances as should be formed normally. I have in mind the important part played by the rumen in the formation of vitamins and other essential substances. In young animals the formation of vitamin C, which is normally formed in the organism, is often inadequate, a fact which has been demonstrated for calves.

It may also happen that the organism is incapable of utilising the vitamins that are present in the feed. It is a well-known fact that disturbances in the gastro-intestinal tract are likely to give rise to disease, due to the failure of the intestine to absorb all the components in the food. In dogs and furred animals disturbances in digestion are often attended by spasms and paralysis, which may be relieved by treatment with vitamin B. In foals and calves the disturbances cause vitamin A deficiency and also B-deficiency. In such cases it is better to give the vitamins in the form of injections, as the patient is unable to utilise them if they are given orally.

Vitamin deficiency may also arise from destruction of the vitamin in the intestine. We know that in some species of furred animals, especially foxes, which are fed large quantities of certain kinds of fish, diseases attended by spasm and paralysis may appear, which are readily cured by injections of vitamin B. This applies particularly to fish belonging to the carp family ; in Sweden the most important one is the bream. It contains a substance which binds or breaks up vitamin B_1. These substances in the bream destroy vitamin B not only in the meat of the fish but also in any other food substance given at the same time. Another example of this is that manganese-rich hay is very poor in vitamin B, because manganese is contained in an enzyme in the plant which splits the vitamin. This applies to the manganese-rich hay in the north of Sweden, which predisposes to infectious anaemia. Hay rich in *Equisetum* is richer in manganese than the hay in the north of Sweden, and its content of vitamin B is practically nil. This hay is supposed to contain a poisonous substance which causes nervous disorders with paralysis and also myositis. If such hay is fed together with large quantities of yeast rich in vitamin B these disturbances will not appear, which shows that they are due to deficiencies in the feed, especially B-deficiency, as the hay is free from this vitamin. The high content of manganese in this hay would probably also destroy vitamin B_1 in the intestine. This is evident from the fact that such hay, fed experimentally, produces these deficiency symptoms in a fortnight to three weeks, that is, in the same period of time as that required to produce, experimentally, B-avitaminosis in rats, whereas in experiments to produce B_1-deficiency in horses by means of other feeds free from vitamin B_1, the symptoms do not appear until after several months. In horses vitamin B_1, which is probably formed normally in the intestine, is destroyed by the manganese-rich *Equisetum* hay.

The Diagnosis of Deficiency Diseases

In order to determine whether a disease is due to deficiencies in the feed, consideration must in the first place be paid to the *quality* of the feed. In this respect there is a slight difference between herbivora on the one hand, and herbicarnivora and carnivora on the other. Omitting from consideration the conditions in towns and other places where the animals' food has to be bought, the feed for herbivora is dependent on the quality of the soil or the treatment of the soil in the place where the animals live. We speak therefore of deficiency districts in those parts of Sweden where deficiency diseases are common. Swine, hens

and furred animals are as a rule fed purchased foodstuffs which are independent of the condition of the soil in the district where they live. In the latter case it is principally the way in which the ration is composed that makes the feed satisfactory or not. The *time* at which the disease appears is also significant. Deficiency diseases, particularly in herbivora, occur mostly during the later part of the winter and in spring, when the animals have lived for a long period on fodder in which the organic components have changed during storage. During the summer and early part of the winter, however, deficiency diseases are less common, particularly in animals which are kept in the open during the summer. This does not apply to those districts where the quality of the soil is so poor that the growing crop also is inferior.

Measures Against Deficiency Diseases

The first thing to be done, of course, is to try to alter the ration or the composition of the feed so as to ensure a fully adequate diet. With regard to herbivora this may be accomplished eventually by improved cultivation of the soil. In most cases, however, it is difficult to bring about an immediate improvement in the composition of the feed. It is therefore necessary to resort to supplements, in order to improve the ration. With regard to animals which are fed purchased fodder, particularly swine, hens and furred animals, it is easier to alter the ration immediately, partly by altering the composition and partly by buying standard fodder.

Finally, I wish to point out that if any true deficiency disease occurs in one member of a group of livestock, it is obvious that a number of animals, perhaps all of them, are exposed to one and the same error in the composition of the feed, and not only the animal that is obviously sick. In such cases our task is to make suitable alterations of the ration fed to all the animals.

THE BRITISH VETERINARY CODEX

In moving the adoption of the report of the Council, the President, Mr. M. Clement Shaw, in the course of his address to the annual meeting of the Pharmaceutical Society of Great Britain, made reference to the formation of the Veterinary Codex Committee which, he said, would prepare a Codex for veterinary use on similar lines to those of the British Pharmaceutical Codex. The Society had the machinery needed for the purpose, and had got together a very fine committee for this work. He supposed that it would be about two years before this new Codex appeared, but when it was ready, he thought, the veterinary people, the agricultural people, and the pharmacists concerned would have at their disposal a standard work on veterinary practice.

[An illustrated account of the first meeting of the committee, seven of the 12 members of which are veterinarians, appeared in our issue of April 29th.—*Editor.*]

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ARMY DOGS AS MINE DETECTORS

Reporting on the varied demonstrations recently carried out by the Royal Engineers at Hawley, Hants, *The Times* Special Correspondent wrote: "Most of the displays were impressive; some were almost awe-inspiring, but none interested the spectators more than mine detection by some assorted dogs. We saw the dummy mines buried, and later saw the dogs come along, wearing ordinary dog harness held by their handlers, and walk eagerly over the minefield Now and then one would sit down abruptly. A sapper who had followed placed a marker between the dog's forepaws and, when the dog was led away, grubbed with his hands under the marker and produced the mine. It was not always a mine that came up; sometimes it was a bottle or a tin.

"No one yet seems to know what canine sense comes into play in this unerring detection of a buried object, nor is the sense peculiar to any particular breed, though the dogs that are quickest at it appear to have a retriever strain somewhere in their ancestry. Long experience in the finding of buried bones may have something to do with the matter. The two dogs we saw at work to-day were said to have been taken from a home for strays."

SOME ASPECTS OF THE MEAT INDUSTRY'S CONTRIBUTION TO SCIENCE

BY

D. J. ANTHONY

In no other industry is so much use made of the "raw material" as in the meat industry. That fact is not always appreciated inside the industry itself, and to the outside public the contribution made by the meat trade to human welfare is almost completely unknown apart from the provision of food for the larder. It would require a lengthy treatise to discuss every item or by-product of this great industry, but it will suffice if some of the "medicinal glands," as they are called, and some other products used in the manufacture of certain articles, receive attention. Prior to the last war the collection of these endocrine glands for extraction work was generally carried on at the world's large meat factories, whilst meat traders at the municipal abattoirs seldom bothered to collect any. The concentration of slaughtering under the Ministry of Food has now made it economically worth while for glands and organs to be collected at all the large slaughtering centres and processed by the Ministry's contractors.

The glands and organs required are collected in the fresh state immediately after the animal is slaughtered, and, where necessary, they are trimmed of any fatty covering and frozen. When a sufficient quantity has been collected they are despatched to manufacturing pharmaceutical chemists for processing. Among the parts used medicinally are the following:—

The pineal body, the small pea-like gland on the upper surface of the brain, the extract of which is used in cases of retarded mental development. The pituitary body in its little bony cavity beneath the brain is particularly valuable as every doctor and veterinary surgeon can testify. The thymus gland (throat and heart sweetbread) found in the young animal and in the castrated animal is useful in cases of malnutrition and rickets. Also in the throat are found the thyroid and parathyroid glands, whose extracts are of importance in combating cretinism, myxoedema, debility, tetany, paralysis agitans and in the control of muscle metabolism.

The supra-renal bodies supply adrenalin and cortisone, and here again there is no necessity to remind medical and veterinary scientists of the importance of these extracts. The sex glands from the various animals, both male and female, provide a variety of substances which are in general medicinal use.

Certain organs are also used for extractives, the most well known being the pancreas for the production of insulin and the liver for the raw extract used against pernicious anaemia. A dried extract for this condition is also made from the pig's stomach. The pig spleen provides an extract which is reported to be of value in greasy legs in horses. Extracts are also made from blood, bone marrow, brain, spinal cord and lymph nodes. Bile is collected and can be used medicinally or for industrial purposes, such as for the manufacture of dyes, soaps and carpet cleaners.

The meat industry itself makes full use of all animal intestines, and indeed the alimentary canal from pharynx to anus is utilised. Stripped of its muscular layers the oesophagus provides a casing for a certain type of sausage, the rumen and reticulum are made into "tripe," whilst the pig's stomach and large intestine provide "chitterlings." The small intestines are known in the trade as "runners," the colon as "middles" and the caecum as

" bungs." All these are used as sausage casings, from the ordinary pork and beef sausage to the larger " luncheons and polonies." The small intestines from small sheep, lambs and pigs can also be used for violin strings and surgical gut, so-called " cat-gut."

In the jewellery trade the fine peritoneal covering of the caecum is used as the so-called " goldbeater's skin." I can well remember some years ago reading an article in one of the Birmingham evening papers on the jewellery trade, for which the city is famous. The author of the article, a local journalist, went on to write in all seriousness of the " thousands of little animals called goldbeaters, slaughtered each year to provide skins for the jewellers' trade "!

As far as all fats are concerned, the chopped or shredded kidneys fat is sold as beef suet, and rendered down kidney and intestinal fat is called " dripping." The leaf (peritoneal) and back fat of the pig is rendered down as lard, the residual fibrous tissue with a certain percentage of fat being sold as " cracklings." All other fats and scrapings can be dry rendered or put through the digester process, followed by chemical extraction, leaving a residue containing an almost negligible quantity of fat. This fat can be further washed, filtered and bleached so as to render it indistinguishable in appearance from best lard. Good fresh bones provide gelatine, or if not fresh, glue or size. Steamed bone flour is bone meal from the digester process. Treated with sulphuric acid, this becomes " bone superphosphate." Bone meal is used as a source of phosphates, hence of phosphorus used in match making. Bone ash is used in the manufacture of china and high-class pottery, as well as in the refining of silver. Bone charcoal is used in sugar refining, bleaching, as a colouring matter in paint and for shoe blacking.

This does not by any means exhaust the use made of the animal's internal anatomy, but let us turn for a moment to the hairy covering. All sorts of brushes are made from the longer, stiffer and straighter kinds of hair. The stiff bristles running along the back of pigs are particularly useful for a variety of brushes, from tooth brushes to shaving brushes, and household brooms. The preparation of the hair for the brush maker is a trade in itself. Ingenious machines can not only sort the hair into sizes but place the bristles in bundles with the roots all to one end. This can be done by working on the hair thickness, the slight tapering towards the " flag " or tip being sufficient to enable a machine working on the pressure of a rubber band over the hair on the conveyer so to sort the bristles that they can be gathered together flag ends uppermost. Such machines will also sort out black bristles from white, again working on a similar principle.

The ingenuity of these machines lies in their simplicity, and the same applies to the delicate and intricate machines used in dealing with the ordinary body hair, the shorter, curly hair, and the long mane and tail hair. The long hair from cows' tails and horses' manes is mixed in certain proportions with the cleaned and dyed pig hair. Fed into a machine, this all comes out as a long hair rope, which is wound on large spools and is then ready for sterilisation by heat. Undoing the hair rope is equally simple and ingenious. This leaves the hair curly and spongy, with its " permanent wave," ready for the insertion of the hair into large Hessian rolls. The final product is in the form of a thick-piled carpet of hair, held together by the Hessian background, and capable of being cut into any shape or size required by the manufacturer of bedding,

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furniture, or by the motor-car upholsterer. The fine silky hair from the cow's ears makes good " camel-hair " artists' brushes. So it goes on—new uses, new machines, new ideas. It was from the meat industry that the motor industry copied its " conveyer belt " system. The ramifications of the meat industry are too numerous to mention, and the factory type of abattoir, although it cannot provide room for all these processes under one roof, is at least more economical and efficient than the local " animal slaughterhouses " in which we in this country have placed our faith. There is more to the meat industry than just killing animals and inspecting meat.

CLINICAL COMMUNICATIONS

ATYPICAL PNEUMONIA IN A CHIMPANZEE TREATED WITH CHLOROMYCETIN

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On January 2nd, 1950, three two-and-a-half-year-old chimpanzees in the Dublin Zoo contracted influenza. They showed symptoms of bronchial catarrh, with cough, nasal discharge and wheeze. They refused sulphamezathine by the mouth, it being very difficult to induce chimpanzees to ingest medicines unless the taste can be made attractive to them. A policy of isolation and keeping them warm was adopted and no medicine administered. By January 6th one male had improved greatly, but the other male and the female showed progressive signs—in the male suggestive of broncho-pneumonia, in the female the condition being atypical. It was decided at this stage to give these two chimps penicillin S-R (P., D. & Co.), 400,000 units being injected intramuscularly once daily. The male improved rapidly, and after the third daily dose his condition was so satisfactory that the treatment was discontinued. The female's condition, on the other hand, continued to deteriorate, so it was decided to try 2 c.c. doses of sulphamezathine, 33⅓ per cent. solution intramuscularly, at eight-hourly intervals, in addition to the daily dose of penicillin. At 9 p.m. on January 8th the respiration rate had risen to 88, the pulse to 104. It was feared the animal would not survive the night; an oxygen chamber, therefore, was improvised, the flow being maintained at 2 to 2½ litres per minute. At midnight she had improved, and took a few spoonfuls of glucose and water. She was taken from the chamber during the night but she retrogressed, so next morning (9th) she was again put into the chamber and oxygen administered for two-hour periods at intervals of three hours.

On the evening of the 9th examination of the animal revealed consolidation of the middle lobe of the right lung, and this was considered to be due to an atypical (virus) pneumonia. In view of the animal's state of collapse it was decided to administer chloromycetin and four capsules of 0·25 gramme each were inserted per rectum, the capsules first being pierced with a needle. This was followed by two capsules every three hours for five doses, and then at four-hourly intervals for five doses. Due to the scarcity of this drug, it was discontinued after the 8 a.m. dose on the 11th. At this stage the temperature was 98·4°, respirations 58, and the animal was taking glucose and water, and grapes. About 4.30 p.m., however, her condition deteriorated considerably in spite of the regular use of the oxygen, the respirations rising to 80, but the temperature remaining normal, so

having obtained a further supply of chloromycetin, two capsules were given at 9 p.m., followed by one capsule at four-hourly intervals for 23 doses. At 10.15 a.m. on the 12th, the animal was very weak, the respirations being 85 and temperature 99°; coramine, 0·5 c.c., therefore, was given by intramuscular injection and the dose repeated at four-hourly intervals, at the same time as the chloromycetin. This was continued for six injections, and then coramine and ephedrine was substituted for a further eight injections.

During the 13th and 14th the animal showed considerable improvement, respirations falling to 58 and some food being taken. Prior to this the only nourishment taken had been glucose and water, and a few skinned grapes. This improvement was maintained, and on the 16th the condition was so satisfactory by midday that all treatment was discontinued; the respirations were 48, temperature 97·4°, and bananas, grapes and pears were being taken freely. Definite signs of resolution were present in the affected lung. This improvement has since been maintained and on February 4th the chimpanzee was perfectly normal and very active.

The chloromycetin was well retained per rectum, although a certain amount of white material was passed. We were informed by the manufacturers that this material was the normal vehicle of glucose and milk sugar.

We are satisfied that a considerable amount of the chloromycetin was absorbed per rectum and that this animal would certainly have died but for this drug. Great credit is due to those members of the staff of the Dublin Zoo who devoted so much time, day and night, to the nursing of this very difficult case.

We wish to thank Medical Gases (Ireland), Ltd., and Parke, Davis & Co., for their technical advice and helpful co-operation.

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OBSTRUCTED CHEEK-POUCH IN A MONKEY

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UNIVERSITY COLLEGE, IBADAN, NIGERIA

Introduction.—A characteristic of many Old World monkeys is the possession of distensible cheeks in which food is temporarily lodged following ingestion. Cheek-pouches are not found in any of the New World monkeys, but occur in a few other animals outside those of general veterinary importance. This pouch is often represented by a small diverticulum of the buccal cavity, capable of considerable dilation, the entrance approximating to the lower border of the mandible. A case has been met in which a foreign body obstructed the cheek-pouch and remained in that position for some considerable period of time. Eventually fistulae developed (Fig. 1). Under general anaesthesia, the condition was rectified easily.

History.—A white collared mangabey developed a unilateral swelling on the side of the lower jaw. There was no evidence of discomfort, and the case existed for approximately a fortnight before serious notice was drawn to it. When first closely examined there appeared to be a circumscribed tumour eroding through the skin at two points. On manipulation the swelling was hard, well defined and freely movable, simulating a typical fibroma. Examination of the inside of the mouth revealed nothing abnormal for the pouch, even though not empty, is concealed from an ordinary inspection of the buccal cavity.

Treatment.—It was decided to remove the swelling by surgical means. The operation was performed under nembutal anaesthesia, and consisted of incising the skin overlying the tumour-like mass. It was then evident that the cheek-pouch was involved. Consequently, the incision was carried through the buccal mucous membrane. An unmasticated oil palm nut was revealed, which effectively transfixed the pouch owing to the presence of a small portion of stalk. Two small fistulae had developed, and these accounted for the eroded areas previously mentioned.

FIG. 1. — Obstructed cheek-pouch showing development of a fistula.

Following removal of the palm nut, the mucous membrane was closed with a single layer of catgut sutures. The overlying skin, with a sparse amount of connective tissue, was united by a row of interrupted, eversion sutures. A dressing of "Thiazamide" powder was applied and, without further interference or a covering of any kind, the wound proceeded to first intention healing.

Despite the wounded cheek, the monkey fed normally following the operation. The affected pouch did not, however, appear to function until healing was complete. Removal of the silk worm gut eversion sutures was effected on the eighth day.

Conclusion.—The case constituted one of mistaken diagnosis which might be of interest to others. It well illustrates the maxim that a knowledge of normal structures must precede successful diagnosis. Had a correct diagnosis been made it should have been possible to avoid surgical interference. Manipulation of the foreign body would probably have been sufficient to remove it, under general anaesthesia. Once an incision had been made it was thought inadvisable to attempt this latter procedure in view of the probability of inflicting further damage on the wounded tissues.

* * * * *

A Note on the Technique of Intravenous Injection in Monkeys

On several occasions in the Zoology department it has been necessary to anaesthetise monkeys, and in all cases the use of intravenous nembutal has proved satisfactory.* In this connection it was necessary to obtain a convenient site for injection.

The vein corresponding in position to the recurrent tarsal of the dog is very well developed in monkeys, and situated even more favourably for the purposes of intravenous injection. In 14 monkeys, of five different species, the position of the vein was found to be invariable. From the lateral aspect of the tarsal joint, a superficial course is followed on the posterior aspect of the tibial region. At the point where the vein lies midway between the two heads of the gastroc-

*WRIGHT, J. G. Veterinary Anaesthesia. Second edition. Baillière, Tindall & Cox.

nemius, it is in line with the long axis of the limb. An intravenous injection can be given at this site with the greatest of ease, even in the smallest monkeys. There is no difficulty in raising the vein with one hand while manipulating the syringe with the other, if necessary.

Fig. 2. — The external saphenous vein demonstrated in a baboon.

During the foregoing procedure the monkey is restrained face downwards on a table. With the animal in this position, the operator can proceed in safety. There are no difficulties provided that the monkey is held by one accustomed to handling it. Intractable cases may require the use of a muzzle or stocks.

The foregoing note has been made in the hope that it might be of value to those who anticipate the use of monkeys for research purposes, and also to those who on rare occasions meet the monkey in veterinary practice. In connection with nembutal anaesthesia the following data are given. The three cases quoted were starved for 12 hours prior to anaesthesia, and were free from metabolic disease.

Weight of monkey	Dosage required to produce surgical anaesthesia
Lb.	Grains per lb. bodyweight
4·75	0·26
6·0	0·23
29·0	0·17

Acknowledgment.—I wish to thank Dr. J. E. Webb for his help and advice in the production of these notes.

Weekly Wisdom

". . . Language is not only the medium to express thought. It is very useful for concealing thought, and perhaps even more serviceable for concealing the lack of thought. It is one of the paradoxies of education that as we proceed to higher levels we are dealing more and more with abstractions where we know less and less. In language, clearness and intelligibility do not readily lend themselves to common understanding. There are some forms of literary composition in which abstractions seem to be particularly at home. The language of the art commentator and the language of the pulpit are especially liable to the sins of vagueness and unmeaning, to say nothing of the language of the political demagogue. High-sounding words and flowing phrases and a mellifluous voice may convey the impression of great erudition and wisdom though a strict analysis might reveal a thought content approaching zero. . . ."—C. B. Farrar (1950) Use and Abuse of Words, *Digest of Neurology and Psychiatry* (Hartford, Connecticut) **18.** 117.

ABSTRACTS

[The Recognition of Subsidiary Factors in the Aetiology of Infective Diseases. Lovell, R. (1950.) *Proc. Roy. Soc. Med.* **43.** 1–10.]

The author classifies very clearly the factors which may be directly responsible for the epidemic characteristics of infective diseases as well as those which play a subsidiary rôle in their aetiology. Among the first factors, attention is focused principally on the distribution of potential pathogens and the resistance of the individual to such pathogens. Lovell gives as examples of latent infection the widespread distribution of *Haem. influenzae* and *Strep. pneumoniae* in the nasopharynx of man and of *Strep. agalactiae* in the milk or on the udder of cows. He states, further, that a similar dispersion of other pathogenic bacteria and viruses might be revealed by frequent examination and more adequate technique. With some diseases such as diphtheria and scarlatina, the resistance of individuals may be judged by the development of the specific antitoxins. On the other hand, the mere possession of antibodies does not always connote resistance since some antibodies, especially agglutinins, may be elicited in response to non-specific stimuli. Many species of animals contain agglutinins for salmonella in their sera and the stimulus has been provided, not by salmonella but by bacteria antigenically related. Another example of the presence of natural agglutinins is furnished by those found against *Pf. mallei* in the sera of many species of domestic animals.

The occurrence of epidemics may be determined by a reduction in the resistance of the host with consequent increase in the virulence of the pathogen as a result of passage, and it is in this transition that subsidiary factors may play an important part. Apart from certain specific nutritional deficiencies such as nicotinic acid deficiency which predisposes to bacterial invasion of the intestinal mucosa, the author does not ascribe to the "nutritional status" an exact rôle since the animal in apparently good health may be more prone to certain infections than one in a poorer physical state. The influence of certain other factors concerned with management and hygiene on the incidence of various infections is discussed with reference to their increasing recognition in the important and widening field of preventive medicine.

S. J. E.

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[The Work of the Agricultural Research Council, 1949. *Brit. Agric. Bull.* **2.** 333.]

The Agricultural Research Council, which was established in 1931, originally was given the duty of advising the Development Commission and the two Agricultural Departments (for England and Wales, and Scotland) on matters affecting agricultural research, including the allocation of funds for that purpose. It is now one of three Government organisations established, under the Lord President of the Council, to promote and co-ordinate research on a wide range of problems that affect the life and activities of the nation as a whole. The supervision of the research work is under two standing committees, broadly dealing with plants and soils on the one hand and with animals on the other, while there are about 40 technical committees which are periodically convened to discuss and plan individual research problems. Previous to the establishment of the Council, there existed many research institutes which are still under the direct control of, and receive financial grants from, the Ministry of Agriculture and Fisheries or from the Department of Agriculture for Scotland: the Council is now responsible for oversight of their scientific programmes and for special

promotions and salaries of their scientific staff. During recent years the Council has established seven research institutes or units which are under its direct control and whose function it is to provide further facilities for the investigation of special problems. Five of these are located at Cambridge, one at Compton, while the Animal Breeding Organisation is divided into scattered sub-stations.

Of the £1,500,000 spent annually on agricultural research, about one-half is allocated to research affecting animals, and this sum is divided equally between animal disease and physiology, genetics and dairying. The submission of the results of research to the service of the farmer is the function of the Agricultural Improvement Councils of England and Scotland, together with the National Agricultural Advisory Service, and a close liaison between these bodies and the Council is maintained to ensure the smooth progress of each new development.

S. J. E.

REVIEW

[Nomenclature of Fungi Pathogenic to Man and Animals. Names Recommended for Use of Great Britain. The Medical Mycology Committee of the Medical Research Council. (1949.) Med. Res. Coun. Memo. No. 23; pp. 12. London: H.M.S.O. 6d.]

This is a report issued by the Medical Mycology Committee of the Medical Research Council setting out approved names for fungi and fungus diseases that occur in the United Kingdom.

Medical mycology is probably worse served by its nomenclature than any other branch of medicine, either human or veterinary. Mycology is a very specialised subject and not one on which the ordinary bacteriologist can work competently. The majority of trained mycologists are specialists in the diseases of plants. Much of the work of medical mycology has been undertaken by persons without the necessary specialised training and as a result names have been introduced on a large scale that have been unsuitable and unacceptable according to recognised rules of nomenclature. A recent census showed that 65 species of fungi listed as pathogenic to man in the British Isles have been recorded in this country under 150 different names and in other countries under many more.

Seven pages of the report consist of an alphabetical list of names of fungi and fungus diseases. Recommended names and rejected names are clearly shown by the use of special types of print.

The following note is made under *Actinomyces israeli* (Kruse) Lachner-Sandoval:—

> "According to Erikson (1940), actinomycosis in cattle is caused by a distinct species; unfortunately, she was only able to compare human isolates from this country with cattle isolates from Australia and the question needs re-investigation. Erikson used the binomial *Actinomyces israeli* for the organism causing actinomycosis in man and designated the cattle organism '*Actinomyces bovis* Harz,' a name which has frequently been applied to the actinomycete of human actinomycosis. M'Fadyean (1932) and Erikson both concluded that *A. bovis* is a *nomen confusum* because it can never be ascertained whether the name was first applied to the organism of actinobacillosis or to that of actinomycosis. If the cattle strains prove to be distinct the question of a new name must be considered. For the time being it is recommended that the strains from man should be regarded as *A. israeli*, those from animals as *A. bovis*."

Cryptococcus farciminosus is a rejected name, being replaced by *Histoplasma farciminosum*. A note is added to the effect that the specific epithet, often incorrectly spelled farcinimosus, is derived from the Latin "farciminum," a disease of horses.

The following note is added with regard to *Microsporum canis* Bodin and the synonyms *Microsporum felineum* Mewborn and *Microsporum lanosum* Sabouraud:—

> "These three names are still widely used for the cat and dog ringworm fungus which commonly attacks man, causing tinea capitis (especially in children) and tinea corporis. There is general agreement among systematists that the species described by Bodin (1902) from the dog in France is the same as that described by Mewborn (1902) later in the same year from the cat in New York. Sabouraud (1909) admitted that his *M. lanosum*, which he had described in the previous year, was based on a pleomorphic culture of *M. canis*."

A short select bibliography of about a score of references is included, these dealing with questions of systematic mycology.

This pamphlet has been issued in the hope that publications dealing with fungi in the United Kingdom will adopt the nomenclature set out and so simplify the task of those concerned with the identification of fungi and the diseases they cause. Many scientific publications have agreed to accept the nomenclature.

SYRINGE STERILISATION

In its issue of May 6th *The Pharmaceutical Journal* reviews this important subject as follows: "The subject of sterilisation of hypodermic syringes, a problem for which a satisfactory solution is yet to be found, has been raised again. Writing to the *Lancet* of April 1st, Dr. F. B. Mallinson described a portable, thermostatically controlled electrical unit which he uses for oil sterilisation, following the procedure given in the M.R.C. War Memorandum No. 6 of 1942. Oil at a temperature of 120° to 130° C. is drawn rapidly into the syringe and then expelled, the process being repeated two or three times. Needles are sterilised by placing in the oil-bath for half to one minute. On April 15th, the *Lancet* published a letter from Dr. C. H. Le May, pointing out that the M.R.C. War Memorandum No. 15, 1945, rejected the oil sterilisation method. Dr. Le May refers to the method recommended by Foster *et al.* (*Proc. roy. Soc. Med.* 1945. **38**, 465) who showed that spores die in five minutes in boiling water to which 2 per cent. of sodium carbonate has been added; and he mentions a report from Harvey (*Proc. roy. Soc. Med.* 1947. **40**, 507) who applied this method to dental instruments and found that the addition of an inert surface-active agent has an effective detergent action. He suggests that further experimentation along these lines (using recently developed synthetic detergents) might produce an acceptable method for sterilising syringes.

"Although the M.R.C. Memorandom of 1945 takes note of the sodium carbonate method, it points out that certain drugs or biological products may be affected by the resulting alkalinity of the syringe. Examples of preparations which would be so inactivated are penicillin and procaine hydrochloride, the latter being precipitated from solutions and becoming ineffective as an analgesic. The use of sodium carbonate was originally suggested for the sterilisation of instruments, a term which was probably not intended to include syringes. In the second paper quoted by Dr. Le May, the methods described were also applied to instruments, and the detergent added to the alkaline sterilising solution was intended for protection; it does, in fact, leave a faint greasy film on the instrument, which forms a protection against rust. While this is certainly an advantage in the sterilisation of instruments, such a film would be a distinct disadvantage in syringes. No doubt there is considerable scope for investigation of the new synthetic detergents for this purpose, but it seems probable that both their physical and chemical properties would be likely to interfere with the production of an efficiently sterilised syringe. Meantime, it appears that the most dependable method of achieving complete bacteriological sterilisation is by heating in an autoclave or hot air oven."

NOTES AND NEWS

Diary of Events

June 17th.—Meeting of the Biochemical Society, in the School of Biochemistry, Tennis Court Road, Cambridge, 11 a.m.

June 21st.—Meeting of the Scottish Metropolitan Branch at the Royal Hotel, Cupar, Fife, 2.30 p.m.

June 22nd.—Central Division, N.V.M.A., Summer Meeting. (See Notice.)

June 29th.—Meeting of Western Counties Division, N.V.M.A., Royal Clarence Hotel, Exeter, 2 p.m.

June 30th.—Meeting of the North Wales Division, N.V.M.A., at the Morville Hotel, East Parade, Rhyl, 2 p.m.

June 30th.—Summer Meeting of the Lancashire Division, N.V.M.A. (See Notice).

June 30th.—Summer Meeting of the Lancashire Division, N.V.M.A. (See Notice).

July 12th and 13th.—Annual General Meeting of the Association of Veterinary Teachers and Research Workers (Northern Region), at Aberystwyth (Veterinary Department, Agricultural Building, Alexandra Road).

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R.C.V.S. Examination

June 22nd.—R.C.V.S. Membership Written Examination.

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N.V.M.A. Council and Committee Meetings

The next Council and Committee meetings of the Association will be held in London on July 12th, 13th and 14th.

The time-table is as follows:—

Wednesday, July 12th, at 36, Gordon Square, W.C.1.
11 a.m. Organising Committee.
2.15 p.m. Veterinary State Medicine Committee.

Thursday, July 13th, at 36, Gordon Square, W.C.1.
10 a.m. Parliamentary and Public Relations Committee.
11.30 a.m. Home Appointments Committee.
2.30 p.m. General Purposes and Finance Committee.

Friday, July 14th, at Connaught Rooms, Great Queen St., W.C.2.
11 a.m. **Council Meeting.**

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PERSONAL

Births.—HERROD-TAYLOR.—To Denise, wife of E. E. Herrod-Taylor, at Prior's Nursing Home, Leamington Spa, a daughter—Heather Ann.

WALKER.—On June 5th, 1950, to Margaret (*née* Payne), wife of John Walker, M.R.C.V.S., of Bygrove House, Witham, Essex, a sister for Penelope.

. . . . .

Marriage.—WILSON—BENHAM.—On June 10th, 1950, in Toronto, Canada, the marriage was solemnised between Arthur Knight Wilson, of Regina, Saskatchewan, and Cicely Benham, M.R.C.V.S., of Caterham, Surrey.

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The Birthday Honours

DR. CARMICHAEL RECEIVES THE C.M.G.

The King's birthday was officially celebrated on Thursday of last week, when the list of honours issued on the occasion was rendered specially noteworthy for our profession by the announcement of the high award of Companion of the Order of St. Michael and St. George to Dr. J. Carmichael, M.R.C.V.S., in his capacity as member of the Colonial Advisory Committee on Agriculture, Animal Health and Forestry.

In addition to his many other activities, Dr. Carmichael has been a prominent member of this Association for many years, particularly as Chairman of the Overseas Services Committee.

The Pharmaceutical Society recently appointed him Chairman of the Action and Uses Sub-committee in connection with the compilation of a British Veterinary Codex.

We are glad to note also the award of the O.B.E. in the Order of the British Empire to Dr. H. G. Lamont, M.R.C.V.S., Senior Principal Scientific Officer, Ministry of Agriculture, Northern Ireland, and to Mr. R. W. M. Mettam, M.SC., M.R.C.V.S., Assistant Director of Laboratory Services, Veterinary Department, Nigeria.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

SWINE FEVER:

Ayrshire.—Kincaidston Farm, Ayr (June 5th).

Surrey.—Lower House Farm, Ewhurst, Cranleigh, Surrey (June 8th).

Wigtownshire.—Woodlands Croft, Barsalloch, Newton Stewart, Wigtownshire (June 9th).

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R.C.V.S. ANNUAL FEE

The Registrar, R.C.V.S., has received a postal order for 21s. (issued at Dinnington, Sheffield, P.O.), but is unable to trace the sender, who omitted to give his name and address. Will this member please communicate with the Registrar?

* * * * *

AIR VETERINARY SERVICE FOR WESTERN NEW SOUTH WALES *

What is believed to be the world's first flying veterinary service is being established for the 18,000,000 acres comprising the "Western Division" of the Australian State of New South Wales.

Australia was the first country in the world to have a flying doctor service for its people. Now, the owners of the 5,500,000 sheep, 45,000 cattle, thousands of horses and other livestock pastured in this area of scattered homesteads and big holdings are to have their own airborne advisers. The plan will be financed by a levy on stock of 2d. to 4d. a head on cattle and ½d. to a ½d. on sheep.

The more thickly-settled and better-watered eastern part of New South Wales supports 44,900,000 sheep and 3,208,752 cattle. It has no serious shortage of veterinary officers. But where the plains behind the Great Dividing Range slope back towards the continent's centre, settlements are often hundreds of miles apart.

War's manpower demands more than halved Australia's pool of veterinary students. Although nearly 100 men are doing their final year of veterinary science at Sydney University to-day, numbers are still far below requirements and it will be many years before the lag is overtaken. (The Sydney University Veterinary School is the only one in Australia which provides the full five-year course for the Bachelor of Veterinary Science degree. Students from New Zealand and Asian countries are enrolled. Dean of the faculty is Australian-born Dr. Harold Roy Carne, D.V.SC.).

Eleven stock inspectors appointed by the State Department of Agriculture formerly attended to the veterinary needs of the pastoral districts in the Western Division of New South Wales, but for years now, there have been only three inspectors, who have been fighting a losing battle against a growing work schedule. It is to remedy this situation that the flying veterinary service has been introduced. Roads in the "far west" are often poor, but the country is mostly flat or undulating and there are many emergency airfields used by private plane owners and by the Flying Doctor Service.

Two flying veterinary officers are to be appointed. They will be based on Broken Hill (population 30,000, silver-lead mining and manufacturing centre) and Bourke (population 2,000, wool and meat town). Broken Hill is 700 miles south-west of Sydney, Bourke 512 miles north-west. Existing Tiger Moth aerial taxi services in each centre will carry the veterinary surgeons on emergency trips to distant homesteads or townships. New South Wales Agricultural Department planners think the complete cost of the service will not exceed £A.4,000 a year. Each flying veterinary officer will be paid £A.960 a year (present salaries for veterinary surgeons range from £A.600 to £A.830). Rangers familiar with livestock and western conditions will be appointed in other districts for routine work, and the newly-organised service is expected to provide a 100 per cent. efficient veterinary "umbrella" for the west.

Because of constant State vigilance, the health level of New South Wales livestock is equal to any in the world. Pleuro-pneumonia is endemic in parts of Queensland, and with the movement of vast herds from the northern State into New South Wales, there are occasional outbreaks there. Infected animals are destroyed

* Contribution, by Angus Brammall, sponsored by the Australian News and Information Bureau.

immediately and others vaccinated. The flying veterinary service will ensure better control of outbreaks.

The veterinary officers and rangers will also keep a close watch for signs of lice infestation, tick attacks or plant poisoning. Lice cause severe wool damage and poor health in sheep. Ticks and toxic plants may cause quick death.

The service will be controlled by the Pastoral Protection Boards which administer the present veterinary framework in the Western Division districts. Each Board has eight unpaid members consisting of local graziers or their managers. There is considerable election rivalry for the three-year term of office and the Boards are directly responsible to the New South Wales Minister for Agriculture.

The originator of the flying veterinary scheme is the New South Wales Agricultural Department's Chief Veterinary Officer, Mr. William Lloyd Hindmarsh, B.V.SC., M.R.C.V.S., a man who believes in applying modern methods to one of the State's oldest and most important industries. He says: "I feel that good use can be made of air transport in helping western stock owners to maintain the health of their herds and thus help step-up production."

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VACCINE AGAINST NEWCASTLE DISEASE

Ministry's Comment on Press Statement

Many of our readers will have noted a widely issued Press statement in which it is indicated that, as the result of work at Weybridge, it may soon be possible "to manufacture a highly successful vaccine for the control of Newcastle disease."

On reference to the Ministry of Agriculture, we are informed that the source of this Press statement is unknown to Weybridge (as it is to us), that the work done on this vaccine will have as yet no effect whatever on the present slaughter policy in regard to Newcastle disease in poultry, and that the Ministry does not intend to make the vaccine available for use until this very valuable investigation has been completed successfully.

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CLINICAL INSTRUMENTS IN 1850

The exhibition illustrating "Medicine in 1850," which opened to the public at the Wellcome Historical Medical Museum, 28, Portman Square, W.1., on May 31st, included exhibits illustrating the development of the stethoscope and the thermometer. Of the former the specimens began with the original type invented by Laennec in 1819, the year in which he published his treatise on the subject. Laennec's instrument was in the shape of a straight pillar used with one ear only. An experimental model of a stethoscope to be used with both ears, like the modern one, was shown in the Great Exhibition of 1851, but the binaural type was not adopted by doctors until after 1855, when it was patented and manufactured in the United States.

The thermometers on view included specimens of the type made for John Hunter (1728 to 1793) for use on animals. The instrument was first used on human beings by James Currie about 1800. The early models had to be read while still held in the patient's mouth, as the mercury dropped immediately they were taken out. About 1863 William Aitken invented a thermometer with a bubble which broke the thread and acted as a marker. But medicine had to wait for Sir Clifford Allbutt to invent a model which had a constriction that broke the thread of mercury and showed the maximum reading as does the modern clinical thermometer.

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LEGAL NOTES

Dehorning by Ligature without an Anaesthetic.—Haywards Heath magistrates fined a cowman and farm manager for subjecting 22 heifers to a dehorning operation when they were not under the influence of an anaesthetic. A summons against the managing director as the owner of the animals was dismissed, the Bench being satisfied that the animals were owned by the firm.

Prosecuting for the R.S.P.C.A., says *The Farmer and Stockbreeder* in its report of the proceedings, Mr. G. Jones said there had sprung up a widespread practice which the Society desired to nip in the bud of unqualified persons performing this operation with a crude technique and the absence of an anaesthetic. The modern method of dehorning was by applying a ligature to the base of the horn, the blood supply was strangled and gradually the horn dropped off. The Animals Anaesthetic Act laid it down that the dehorning operation must be carried out with either a local or general anaesthetic.

Mr. Roy Lawrence, defending, submitted that whereas dehorning by shears or a saw or by burning was a major surgical operation, applying a rubber band around the horn could not be described as an operation.

The chief veterinary surgeon of the R.S.P.C.A., Major R. C. Hancock, said that the technique of dehorning had been considerably simplified. With the ligature method the circulation was cut off and numbness would be experienced after about 30 minutes. An anaesthetic would relieve all pain for a period of several hours. The actual operation, he thought, was the putting on of the band and after that the animal should normally feel only discomfort. The maximum penalty for the offence was £5.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

MASTITIS MEDICATION IN RELATION TO ANIMAL HEALTH

Sir,—Mr. R. W. Johnston in a letter published in your issue of May 27th emphasises the danger to man of toxic substances introduced into the cow's udder in the treatment of mastitis. He suggests particularly in regard to 4:4'-diamino-diphenyl sulphone ("Udolac"), that insufficient work has been done on the pharmacology of the drug, and implies that little is known of its absorption and excretion rates in cattle. In fact the position has been very carefully and fully explored. Publications on the subject have appeared in a number of journals, particularly *The Veterinary Record* (McEwen and co-workers, and Francis), *The Veterinary Journal* (Francis), and the *Journal of Comparative Pathology and Therapeutics* (Francis). Indeed the detailed pioneer work accomplished in the veterinary field in this direction doubtless revived interest in sulphone in human medicine with the result that it is now coming into wide usage there, particularly against leprosy.

The tragic case of the child who succumbed to a gross overdose of the drug is, of course, well known. Many other materials freely available to the public and self-administered in the same way would, unfortunately, have had the same result, and the occurrence cannot be held to indicate any extraordinary toxic hazard. The labelling of an article as a poison or otherwise is, of course, a legal requirement with which all manufacturers comply.

Yours faithfully,

Imperial Chemical Industries, Ltd., D. D. Ogilvie.
Fulshaw Hall,
Wilmslow,
Manchester.

June 5th, 1950.

* * * * *

ATTESTATION: IS IT A GOOD POLICY?

Sir,—There is a considerable body of opinion in our profession and in the medical profession which contends that the reduction of the incidence of bovine tuberculosis has been followed by an increase of the disease in man, due to the human type bacillus. Has due allowance been made for the housing conditions of the population in the areas which have been cited?

After spending a vacation last year in one such area I came to the conclusion that it was a waste of time to designate any herd until those who consumed the milk were provided with modern habitation.

Mastitis is no more common in a designated than in a non-designated herd. In the former, the owner appreciates the wisdom of seeking early advice, with the result that we are consulted should any cow show any departure from normal in the udder or its secretion. In the latter these are disregarded, described as a "chill," and duly added to the churn.

Judging by *post-mortem* examinations made during the past 30 odd years on cattle dying, or slaughtered, for various reasons, I am convinced that Johne's disease is far more prevalent than one might assume.

The Accredited Herd is a menace, as for the most part it is a sanctuary for cattle that fail to pass the Tuberculin Test, and if this is worth anything, those that fail to pass cannot be considered as suitable agents for producing milk for human consumption.

Yours faithfully,

"Rothiemurchus," J. F. D. Tutt.
Winchester.

June 3rd, 1950.